ESM201-assignment2

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```
# Reading in data and setting up libraries

library(tidyverse)
```

```
## -- Attaching packages ----------------------------------------------------------------------
## v ggplot2 3.1.0     v purrr   0.2.5
## v tibble  1.4.2     v dplyr   0.7.6
## v tidyr   0.8.1     v stringr 1.3.1
## v readr   1.1.1     v forcats 0.3.0
## -- Conflicts ------------------------------------------------------------------------------- t
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
grain <- read_csv("grain.csv")
```

```
## Parsed with column specification:
## cols(
##   year = col_integer(),
##   commodity = col_character(),
##   acres_planted = col_double(),
##   acres_harvested = col_double(),
##   production = col_number(),
##   yield = col_double(),
##   price_per_bushel = col_double()
## )
```

```
fertilizer <- read_csv("fertilizer.csv")
```

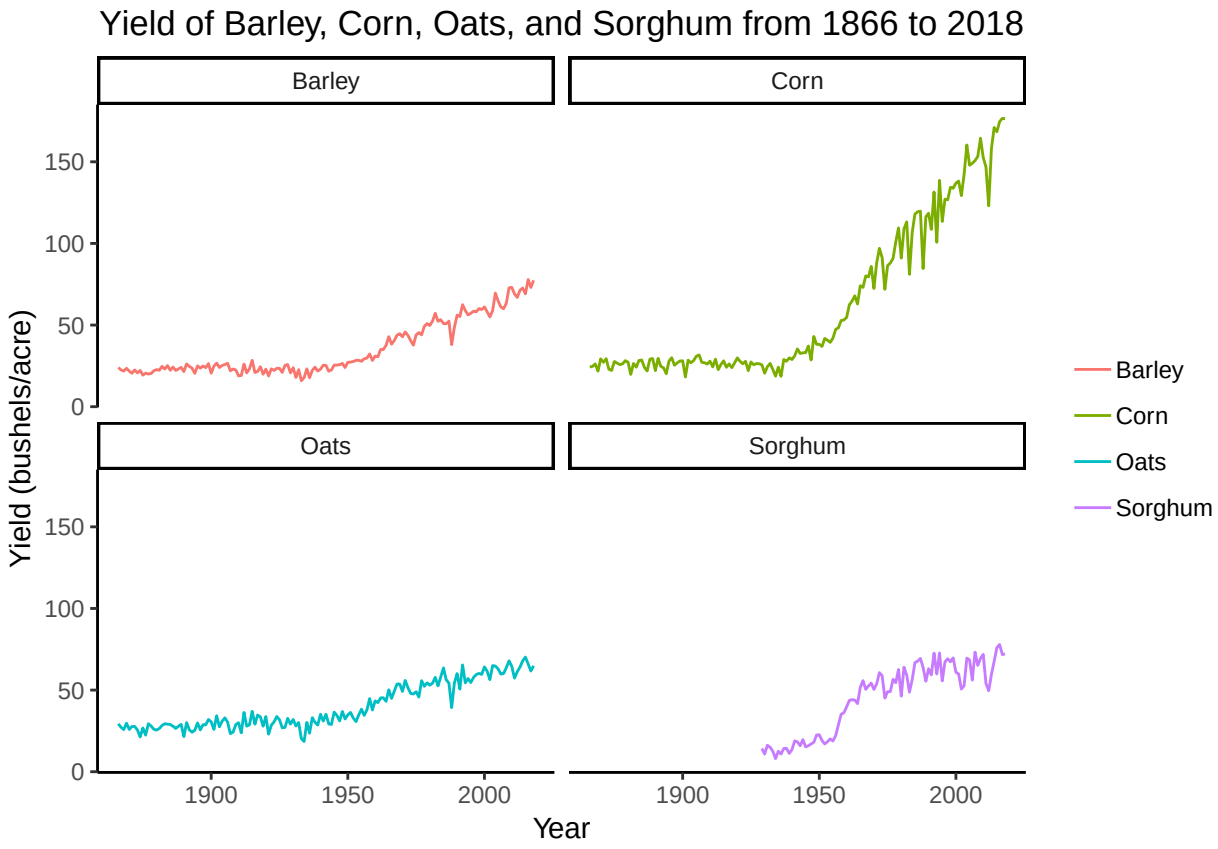
```
## Parsed with column specification:
## cols(
##   year = col_integer(),
##   crop = col_character(),
##   fertilizer = col_character(),
##   ppa = col_integer()
## )
```

```
library(RColorBrewer)
```

```
grains_yield <- grain %>%
  select(year, yield, commodity) %>%
  group_by(commodity)

corn_yield_simple <- grains_yield %>%
  filter(commodity == "Corn")

grains_plot <- ggplot(grains_yield, aes(x = year, y = yield)) +
  geom_line(aes(color = commodity)) +
  facet_wrap("commodity") +
```

```
  theme_classic() +
  xlab("Year") +
  ylab("Yield (bushels/acre)") +
  ggtitle("Yield of Barley, Corn, Oats, and Sorghum from 1866 to 2018") +
  theme(plot.title = element_text(hjust = 0.5)) +
  scale_x_continuous() +
  scale_y_continuous() +
  theme(legend.title=element_blank())

grains_plot
```

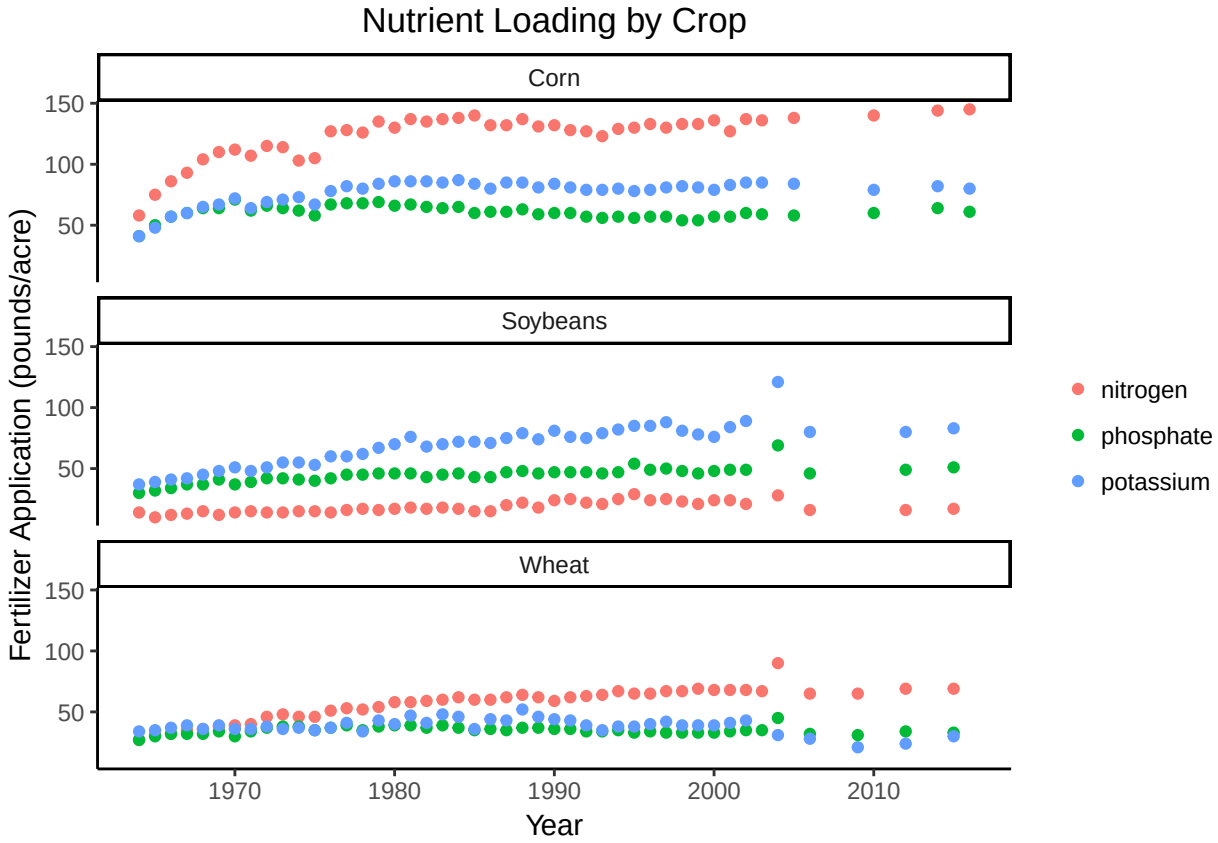
```
## Warning: Removed 10 rows containing missing values (geom_path).
```




```
fertilizer_simple <- fertilizer %>%
  group_by(crop)

fertilizer_plot <- ggplot(fertilizer_simple, aes(x = year, y = ppa)) +
  geom_point(aes(color = fertilizer)) +
  facet_wrap("crop", ncol = 1) +
  theme_classic() +
  xlab("Year") +
  ylab("Fertilizer Application (pounds/acre)") +
  ggtitle("Nutrient Loading by Crop") +
  theme(plot.title = element_text(hjust = 0.5)) +
  scale_x_continuous() +
  scale_y_continuous() +
  theme(legend.title=element_blank())
```

```
fertilizer_plot
```

```
## Warning: Removed 76 rows containing missing values (geom_point).
```




```
# Creating a simplified df to represent just corn yield by year
fertilizer_corn <- grain %>%
  filter(commodity == "Corn") %>%
  select(year, commodity, yield)

# Join both df's by year so that one df has year, type of fertilizer applied to corn in that year, the
fertilizer_merge <- merge(fertilizer_simple, corn_yield_simple, by="year") %>%
  group_by(fertilizer) %>%
  filter(crop == "Corn") %>%
  select(year, fertilizer, ppa, yield)

# Visualizing with a graph
corn_plot <- ggplot(fertilizer_merge, aes(x = ppa, y = yield)) +
  geom_point(aes(color = year)) +
  scale_color_gradient(low = "green3", high = "red") +
  facet_wrap("fertilizer") +
  theme_classic() +
  xlab("Fertilizer Added (pounds/acre)") +
  ylab("Yield (bushels/acre)") +
  ggtitle("Corn Yields through Time by Fertilizer Application Type") +
  theme(plot.title = element_text(hjust = 0.5)) +
  scale_y_continuous() +
  theme(legend.title=element_blank())
```

```
corn_plot
```

```
## Warning: Removed 27 rows containing missing values (geom_point).
```